

Energy Conservation

DEPARTMENT OF ENERGY
FY 1998 CONGRESSIONAL BUDGET REQUEST

Proposed Appropriation Language

Energy Conservation

For necessary expenses in carrying out energy conservation activities, [~~\$569,762,000~~ \$707,700,000, to remain available until expended, including, notwithstanding any other provision of law, the excess amount for fiscal year [1997] 1998 determined under the provisions of section 3003(d) of Public Law 99-509 (15 U.S.C. 4502): Provided, That [~~\$149,845,000~~ \$191,100,000 shall be for use in energy conservation programs as defined in section 3008(3) of Public Law 99-509 (15 U.S.C. 4507) and shall not be available until excess amounts are determined under the provisions of section 3003(d) of Public Law 99-509 (15 U.S.C. 4502): Provided further, That notwithstanding section 3003(d)(2) of Public Law 99-509 such sums shall be allocated to the eligible programs as follows: [~~\$120,845,000~~ \$154,100,000 for weatherization assistance grants and [~~\$29,000,000~~ \$37,000,000 for State energy conservation grants.

EXPLANATION OF CHANGE

Deletes funding amounts which had specific application to FY 1997 and includes the appropriate funding amounts for FY 1998.

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(Tabular dollars in thousands, Narrative in whole dollars)

ENERGY EFFICIENCY PROGRAMS

EXECUTIVE SUMMARY

Introduction

The mission of the Office of Energy Efficiency and Renewable Energy is to work with our customers to lead the nation to a stronger economy, a cleaner environment, and a more secure future by developing and deploying sustainable energy technologies that meet the needs of the public and the marketplace.

Energy efficiency and renewable energy technologies are among the most cost-effective means available for improving U.S. environmental quality, increasing national energy security and stimulating long term economic growth. Over the last two decades, the Department of Energy's energy efficiency and renewable energy - EERE - programs have produced remarkable successes for America's long-term economic growth, improved environmental quality and continued world leadership in technology. Few Federal programs have produced higher returns on the taxpayer dollar.

In 1995, an independent commission headed by energy expert Daniel Yergin confirmed that two dozen energy efficiency technologies developed with DOE funds are now "generating billions of dollars worth of annual consumer energy savings and new business opportunities, and playing an important role in job creation." Since 1991 we have won 35 R&D 100 awards "...for the most technologically significant new products." This represents 6% of these prestigious international awards during this time. This is more remarkable considering the EERE budget represents less than one-half of one percent of the total U.S. R&D budget.

New energy technologies are instrumental in solving complex interrelated environmental, social, and economic problems. For the government, delivering a new technology to the marketplace is a result of a series of research activities designed to test and develop good ideas that would not otherwise be undertaken by business because of the high individual risk, difficulty in capturing a return on the initial investment, complex cross-cutting nature of the effort, or public nature of the benefits are inappropriate to their necessarily near-term market focus. These research stages involve constant collaboration with customers and partners and include: concept development, market and technical feasibility studies, system and component design, research plans, research, prototype construction and testing at many stages, scale-up demonstrations, and an array of deployment activities. Collectively the stages constitute a research "pipeline" to energy product markets.

In FY 1998 the Office of Energy Efficiency and Renewable Energy plans over 200 R&D projects in various stages of the research pipeline. This year we expect to work with 2000 partners including consortia, laboratories, industry groups, states and retailers that

ENERGY EFFICIENCY PROGRAMS - EXECUTIVE SUMMARY (Cont'd)

will conduct R&D and help deploy EE/RE technologies to thousands of sites and users including foreign countries, over 50 clean cities, all 50 states, 800 utilities, 1000 industrial partners and thousands of buildings and demonstration fleet vehicles. Those partner-customers of EERE technologies lead the deployment of energy technologies that will address the needs of the public and the marketplace.

The challenge DOE faces in FY 1998 is to produce beneficial new technologies with fewer resources, maintaining the vital contribution of energy efficiency and renewable energy in the Administration's and Congress' vision. To accomplish this goal, DOE's FY 1998 Budget Request proposes funding for programs that will leverage significant non-Federal investments and will produce high economic, environmental and energy-security benefits, while accelerating the entry of U.S. technologies into the global marketplace.

To meet this challenge we are utilizing existing, effective State deployment networks. Our State grant programs provide cost-effective technical assistance to business and industry. They generate huge non-federal investments in energy projects averaging \$19 dollars of public and/or private investments for every federally appropriated dollar.

Situation Report

The following factors were considered in the FY 1998 Congressional Budget Request for energy efficiency and renewable energy:

- National Science Foundation data indicate that the U.S. investment in R&D is in decline. Since 1987, Federal R&D investments have dropped steadily in real terms. Since 1992, private industry R&D has stagnated. And today, less than one-third of private R&D is dedicated to research; the rest is being spent on product and process development.
- At a time of increased public concern about environmental quality and the rising costs of environmental compliance for businesses, energy efficiency and renewable energy technologies offer pollution prevention solutions that often pay for themselves through energy savings and waste reduction.
- As a percent of gross national product, the U.S. national investment in non-defense R&D remains well below that of Japan and Germany. U.S. energy efficiency, measured as energy consumption per dollar of gross domestic product, also remains well below that in Germany and Japan.
- U.S. oil imports are at record levels, are continuing to grow, and are projected by the Energy Information Administration to reach 63 percent by 2005. Oil imports that high would contribute nearly \$90 billion to the trade deficit and, according to recent Department of Commerce and GAO analyses, constitute a threat to U.S. economic security. Persian Gulf countries are projected to control 70 percent of the global market for oil by 2010 - making world oil markets increasingly unstable.

ENERGY EFFICIENCY PROGRAMS - EXECUTIVE SUMMARY (Cont'd)

- Energy consumption continues to have a real impact on individual Americans. The typical American family of four is spending \$2,200 each year on energy -- more than all other expenses except housing.
- Emerging global markets in environmental technologies are potentially worth hundreds of billions of dollars to American industry. Increasingly severe environmental problems plague many of the fastest growing developing nations around the world. Energy efficiency and renewable energy technologies are increasingly seen around the world as a means to reduce the environmental damage caused by energy production and use and industrial production. The demand for these technologies is huge - and growing - and the governments of our economic competitors are, collectively, investing billions of dollars per year to capture these markets.
- Energy efficiency and renewable energy technologies save money, prevent pollution and create jobs today and tomorrow. These technologies range from the advanced wind turbines that provide commercial electricity for more than one million Americans, to more energy efficient appliances in virtually every kitchen, to electronic ballasts saving up to 30 percent on lighting costs - all developed with DOE support. Research on many of tomorrow's best energy technologies is supported by DOE today. Significant Federal disinvestment in this research will lose or substantially delay these technologies and their benefits.

Alignment with Administration Priorities

The energy efficiency and renewable energy programs proposed by DOE for FY 1998 will continue progress toward achieving key goals of the Administration's research and development agenda:

- **Building International Competitiveness with Technology.** Technology development is the key driver of long term economic growth for our nation. Sustained economic growth is dependent upon steady increases in the efficiency of production processes. Technology is the key *enabling input* because it increases the efficiency in which inputs are used, thereby enabling a country to produce more with less. Realizing this fact, governments around the world have historically invested in scientific research and technology development. The federal government has played a pivotal role in developing the world's most successful system of research and development. Maintaining the vigor of research and development is essential to the nation's future and will require the ability to increase funding for new opportunities selectively, even while reducing the overall budget. (*Allocating Funds for Science and Technology*, National Academy of Sciences 1995.)
- **Maintaining world leadership in science, engineering and mathematics.** DOE's National Renewable Energy Laboratory, for example, has won 18 R&D 100 awards since 1982. (The prestigious R&D 100 awards recognize the most important technological advances around the world each year.) Among the widely praised technological breakthroughs among DOE's national laboratories in the last year alone are a low cost aerosol method of sealing heating and cooling ducts in buildings to cut energy losses; a highly efficient central solar power station; and the grand award winner - a photovoltaic

ENERGY EFFICIENCY PROGRAMS - EXECUTIVE SUMMARY (Cont'd)

roof shingle that closely resembles conventional shingles yet can produce electricity for homes and businesses directly from the sun.

- **Promoting long-term economic growth that creates jobs.** A growing body of analysis concludes that money invested in energy efficiency produces more jobs than money invested in conventional power production and in a host of other common economic activities. Recently published case studies demonstrate that energy efficiency technologies not only cut costs and save jobs for businesses, but significantly improve their productivity.
- **Improving the nation's environmental quality.** In developing and promoting the efficient use of clean energy resources, DOE's energy efficiency and renewable energy programs result in reduced air, water and ground pollution, often reducing industry environmental compliance costs, concurrent with reduced production costs. In other words, these technologies make environmental progress compatible with economic growth and improved productivity. Estimated reductions in greenhouse gas emissions alone are projected to be 25 million metric tons (MMT) in 2000 and over 100 MMT by 2010. Similar substantial reductions in other air emissions and waste production are projected.

Strategic Priorities

The DOE energy efficiency and renewable energy budget request supports a balanced portfolio of high-priority technology research and development that will achieve the above goals. Key priorities include:

- A Presidential public Partnership for a New Generation of Vehicles, including advanced materials, energy storage, and other new technologies that will triple the efficiency of U.S. passenger vehicles while improving safety and environmental quality;
- Technologies that concurrently meet energy, economic, and environmental objectives, deployed voluntarily through the Climate Change Action Plan;
- Advanced buildings for the 21st century that will use less energy, cost less to build and produce less pollution - yet be more comfortable and productive;
- Advanced biotechnologies for industrial processes and fuel production;
- Advanced power generation technologies using renewable energy resources and building upon recent advances in superconductivity, energy storage and system control technology;
- Technologies leading to improved energy and resource efficiency of energy-intensive industries, which reduce environmental emissions and cut business compliance costs;
- Investments in Federal energy efficiency that cut government operating costs; and
- Investments in State and community energy programs that effectively cut energy costs for small business, industry, and low-income households.

Strategic Principles

To maintain program excellence while minimizing costs, DOE's energy efficiency and renewable energy programs reflect these principles emphasized by the Administration:

- Peer Review:** In addition to the Yergin Commission review quoted above, DOE's energy efficiency and renewable energy programs for FY 1998 reflect an internal evaluation and prioritization process. Based on the A.D. Little & Co.'s "Third Generation" R&D portfolio analysis, the Office of Energy Efficiency and Renewable Energy has conducted an intensive analysis of all our historic programs resulting in increased focus on our highest priority projects. Completions, efficiencies and strategic review based consolidations, scope and schedule changes, and terminations has allowed us to reduce our spending while maintaining our priorities.
- Joint Funding:** One method for insuring our technologies are market directed is to collaborate and increasingly cost share our technology development as it moves from basic research to product development. DOE routinely requires cost sharing from industries, states and other program partners ranging from a fractional partners share in risky research to a dominant cost-sharing for scale-up and deployment efforts. The department's goal is to achieve maximum leveraging from Federal funds. In one recent case, for example, \$500,000 in Federal funds were used to attract nearly \$33 million in state, local and private funds to DOE's Rebuild America program, an initiative that implements energy efficiency technologies in commercial and government buildings at the state and local level.
- Multiple Goals:** Few Federal programs produce such diverse benefits. Benefits from DOE's energy efficiency and renewable energy activities include: reduced pollution and related health-care costs; reduced oil imports; lower trade deficits; increased local and national economic security; lower consumer energy bills; lower taxpayer costs for energy consumption in public buildings; increased industrial competitiveness; competitive U.S. products for vibrant new export markets; reduced threats of future military actions to assure foreign energy supplies; the creation of new industries and jobs; and hands-on educational opportunities for the next generation of scientists and engineers. DOE energy efficiency and renewable energy programs produce consequential benefits across all these categories this year and will for years into the future.
- Performance Measures:** The Office of Energy Efficiency and Renewable Energy has developed a peer-reviewed "quality metrics" system that allows DOE to set concrete goals, measure program progress, impacts and success. This evolving strategic management process, while providing valuable input to program planning and improvement, exceeds the requirements of the Government Performance and Results Act of 1994.

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ENERGY CONSERVATION
(Dollars in thousands)

ENERGY EFFICIENCY PROGRAMS
PROGRAM FUNDING SUMMARY

<u>Program/Subprogram/Activity</u>	<u>FY 1996 Enacted</u>	<u>FY 1997 Enacted</u>	<u>FY 1998 Request</u>
I. Transportation Sector	<u>\$174,288</u>	<u>\$175,203</u>	<u>\$203,246</u>
A. Technology Deployment	16,840	10,800	17,000
B. Advanced Automotive Technologies	100,672	104,640	129,046
C. Advanced Heavy Vehicle Technologies	14,654	19,503	18,000
D. Transportation Materials Technologies	34,323	32,860	30,500
E. Implementation and Program Management	7,799	7,400	8,700
II. Industry Sector	<u>114,369</u>	<u>117,566</u>	<u>139,559</u>
A. Industries of the Future (Specific)	41,692	46,266	55,660
B. Industries of the Future (Crosscutting)	38,651	39,350	39,120
C. Municipal Solid Waste	192	0	0
D. Technology Access	26,712	24,950	37,079
E. Management & Planning	7,122	7,000	7,700
III. Building Technology, State, and Community Sector	<u>214,510</u>	<u>231,043</u>	<u>302,415</u>
A. Building Systems Design	23,064	23,586	32,841
B. Building Equipment and Materials	27,071	26,535	37,151
C. Codes & Standards	12,520	12,115	20,573
D. State and Local Partnership Programs	139,501	151,445	192,700
E. Management and Planning	12,354	17,362	19,150
IV. Federal Energy Management Program	18,329	19,800	31,100
V. Policy and Management	34,017	26,150	31,380
SUBTOTAL ENERGY CONSERVATION APPROPRIATION	<u>555,513</u>	<u>569,762</u>	<u>707,700</u>
Financing: PODRA			
Energy Security Reserve (NON-ADD)	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL ENERGY CONSERVATION	<u>\$535,713</u>	<u>\$549,762</u>	<u>\$687,700</u>
Total Staffing (FTEs)	491	450	415

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ENERGY EFFICIENCY PROGRAMS
PROGRAM FUNDING DETAIL

<u>Program/Subprogram/Activity</u>	<u>FY 1996 Enacted</u>	<u>FY 1997 Enacted</u>	<u>FY 1998 Request</u>
I. Transportation Sector			
A. Technology Deployment	<u>\$16,840</u>	<u>\$10,800</u>	<u>\$17,000</u>
1. Clean Cities Voluntary Deployment	5,550	2,748	3,800
2. Infrastructure, Systems, and Safety	950	1,605	4,750
3. EPACT Replacement Fuels Program	2,126	1,475	1,600
4. Vehicle Field Test/Evaluation	5,056	2,472	3,700
5. Technical Information Development	3,158	2,500	3,150
B. Advanced Automotive Technologies	<u>100,672</u>	<u>104,640</u>	<u>129,046</u>
1. Automotive Alternative Fuels R&D	2,205	3,220	5,000
2. Electric Vehicle R&D	18,930	17,820	19,286
3. Vehicle Systems R&D	52,690	54,850	67,700
4. Fuel Cell R&D	21,497	21,150	29,560
5. Advanced Combustion Engine R&D	5,350	7,600	7,500
C. Advanced Heavy Vehicle Technologies	<u>14,654</u>	<u>19,503</u>	<u>18,000</u>
1. Heavy Vehicle Systems R&D	5,389	7,100	9,100
2. Heavy Vehicle Alternative Fuels R&D	9,265	12,403	8,900
D. Transportation Materials Technologies	<u>34,323</u>	<u>32,860</u>	<u>30,500</u>
1. Automotive Materials Technology	18,232	20,371	17,500
2. Heavy Vehicle Materials Technology	10,638	7,829	7,800
3. High Temperature Materials Laboratory	5,453	4,660	5,200
E. Implementation and Program Management	<u>7,799</u>	<u>7,400</u>	<u>8,700</u>
1. Evaluation, Planning and Analysis	1,999	1,700	2,300
2. Program Direction	5,800	5,700	6,400
3. Capital Equipment	0	0	0
Total Transportation Sector	<u>\$174,288</u>	<u>\$175,203</u>	<u>\$203,246</u>
Staffing Transportation Sector (FTEs):			
Oak Ridge Operations Office	70	62	58

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<u>Program/Subprogram/Activity</u>	<u>FY 1996 Enacted</u>	<u>FY 1997 Enacted</u>	<u>FY 1998 Request</u>
Headquarters	<u>1</u>	<u>1</u>	<u>1</u>
Total FTEs	71	63	59
II. Industry Sector			
A. Industries of the Future (Specific)	<u>\$41,692</u>	<u>\$46,266</u>	<u>\$55,660</u>
1. Forest & Paper Products Vision	11,045	11,140	12,340
2. Steel Vision	6,573	9,060	9,726
3. Aluminum Vision	1,414	5,587	7,735
4. Metal Casting Vision	1,945	3,500	5,480
5. Glass Vision	1,396	3,000	4,765
6. Chemicals Vision	12,792	10,140	12,614
7. Petroleum Refining Vision	6,527	3,839	3,000
B. Industries of the Future (Crosscutting)	<u>38,651</u>	<u>39,350</u>	<u>39,120</u>
1. Cogeneration	21,244	24,650	24,650
2. Advanced Materials & CFCCs	17,339	14,700	14,470
3. Combustion Technologies	68	0	0
C. Municipal Solid Waste	192	0	0
D. Technology Access	<u>26,712</u>	<u>24,950</u>	<u>37,079</u>
1. IACs/Technology Transfer	8,448	8,200	9,309
2. Motor Challenge	5,131	5,150	7,230
3. NICE-3	5,857	5,800	12,000
4. Climate Wise	1,952	1,000	3,780
5. Inventions & Innovation	\$5,324	\$4,800	\$4,760
E. Management & Planning	<u>\$7,122</u>	<u>\$7,000</u>	<u>\$7,700</u>
1. Evaluation and Planning	600	500	800
2. Program Direction	6,522	6,500	6,900
3. Capital Equipment	0	0	0
Total Industry Sector	<u>\$114,369</u>	<u>\$117,566</u>	<u>\$139,559</u>

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<u>Program/Subprogram/Activity</u>	<u>FY 1996 Enacted</u>	<u>FY 1997 Enacted</u>	<u>FY 1998 Request</u>
Staffing Industry Sector (FTEs):			
Albuquerque Operations Office	2	0	0
Chicago Operations Office	5	6	6
Idaho Operations Office	4	5	5
Headquarters	<u>63</u>	<u>64</u>	<u>63</u>
Total FTEs	74	75	74
III. Building Technology, State, and Community Sector			
A. Building Systems Design	<u>\$23,064</u>	<u>\$23,586</u>	<u>\$32,841</u>
1. Residential Buildings	7,978	9,197	13,597
2. Commercial Buildings	10,550	9,000	10,730
3. Best Practices	4,536	5,389	8,514
B. Building Equipment and Materials	<u>27,071</u>	<u>26,535</u>	<u>37,151</u>
1. Space Conditioning R&D	10,011	11,613	14,080
2. Lighting & Appliance R&D	7,490	6,902	11,322
3. Materials and Structures R&D	3,332	2,600	4,140
4. Windows and Glazings R&D	6,238	5,420	7,609
C. Codes & Standards	<u>12,520</u>	<u>12,115</u>	<u>20,573</u>
1. Building Standards & Guidelines	7,290	7,045	11,953
2. Lighting and Appliance Standards	\$5,230	\$5,070	\$8,620
D. State and Local Partnership Programs	<u>\$139,501</u>	<u>\$151,445</u>	<u>\$192,700</u>
1. Weatherization Assistance Program	111,764	120,845	154,100
2. State Energy Program	25,936	29,000	37,000
3. Municipal Energy Management	1,801	1,600	1,600
E. Management and Planning	<u>12,354</u>	<u>17,362</u>	<u>19,150</u>
1. Evaluation and Planning	5,391	10,410	11,800
2. Program Direction	6,963	6,952	7,350
3. Capital Equipment	0	0	0

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<u>Program/Subprogram/Activity</u>	<u>FY 1996 Enacted</u>	<u>FY 1997 Enacted</u>	<u>FY 1998 Request</u>
Total Building Technology, State, and Community Sector	\$214,510	\$231,043	\$302,415
Staffing Building Technology, State, & Community Sector (FTEs):			
Headquarters	85	78	78
Total FTEs	85	78	78
IV. Federal Energy Management Program			
A. Federal Energy Efficiency Fund	\$0	\$0	\$0
B. Project Financing	2,890	7,000	12,700
C. Technical Guidance & Assistance	8,403	6,800	9,900
D. Planning, Reporting, & Evaluation	5,334	4,200	6,400
E. Capital Equipment	0	0	0
F. Program Direction	1,702	1,800	2,100
Total Federal Energy Management Program	\$18,329	\$19,800	\$31,100
Staffing Federal Energy Management Program (FTEs):			
Headquarters	18	22	20
Total FTEs	18	22	20
V. Policy and Management			
A. Headquarters	\$8,918	\$7,145	\$7,994
1. Salaries and Related Expenses	4,962	4,006	3,285
2. Contractual Services	3,956	3,139	4,709
B. Golden Field Office	3,018	4,505	5,096
1. Salaries and Related Expenses	2,010	3,465	2,966
2. Contractual Services	1,008	1,040	2,130
C. Regional Support Offices	13,639	10,400	12,390
1. Salaries and Related Expenses	9,468	8,810	8,360
2. Contractual Services	4,171	1,590	4,030

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D. International Market Development Program	6,840	2,600	2,900
E. Information and Communications Program	1,602	1,500	3,000
Total Policy and Management - EC	<u>\$34,017</u>	<u>\$26,150</u>	<u>\$31,380</u>
Staffing Policy Management (FTEs):			
Chicago Operations Office	3	0	0
Golden Field Office	24	42	33
Regional Support Offices	141	118	110
Headquarters	<u>75</u>	<u>52</u>	<u>41</u>
Total FTEs	243	212	184
R&D	\$417,813	\$419,917	\$516,600
ENERGY CONSERVATION GRANTS	137,700	149,845	191,100
SUBTOTAL ENERGY CONSERVATION APPROPRIATION	555,513	569,762	707,700
Financing: PODRA			
Energy Security Reserve (NON-ADD)	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL ENERGY CONSERVATION	\$535,713	\$549,762	\$687,700
Total FTEs	491	450	415

Energy Efficiency - Transportation Sector Program

(Dollars in Thousands)

Budget Comparability Matrix

		FY 1996	FY 1997	FY 1998
Transportation Sector		\$174,288	\$175,203	\$203,246
New	Technology Deployment	16,840	10,800	17,000
Old	Alternative Fueled Vehicles	16,840	10,800	17,000
New	Advanced Automotive Technologies	100,672	104,640	129,046
Old	Alternative Fueled Vehicles	2,205	3,220	5,000
Old	Electric Drive Vehicle Technologies	93,117	93,820	116,546
Old	Combustion Engine R&D	5,350	7,600	7,500
New	Advanced Heavy Vehicle Technologies	14,654	19,503	18,000
Old	Alternative Fueled Vehicles	9,265	12,403	8,900
Old	Combustion Engine R&D	5,389	7,100	9,100
New	Transportation Materials Technologies	34,323	32,860	30,500
Old	Transportation Materials Technologies	34,323	32,860	30,500
New	Implementation and Program Management	7,799	7,400	8,700
Old	Implementation and Program Management	7,799	7,400	8,700

Energy Efficiency - Transportation Sector Program

(Dollars in Thousands)

Budget Comparability Matrix

		FY 1996	FY 1997	FY 1998
Transportation Sector		\$174,288	\$175,203	\$203,246
Old	Alternative Fueled Vehicles	28,310	26,423	30,900
New	Technology Deployment	16,840	10,800	17,000
New	Advanced Automotive Technologies	2,205	3,220	5,000
New	Advanced Heavy Vehicle Technologies	9,265	12,403	8,900
Old	Electric Drive Vehicle Technologies	93,117	93,820	116,546
New	Advanced Automotive Technologies	93,117	93,820	116,546
Old	Transportation Materials Technologies	34,323	32,860	30,500
New	Transportation Materials Technologies	34,323	32,860	30,500
Old	Combustion Engine R&D	10,739	14,700	16,600
New	Advanced Automotive Technologies	5,350	7,600	7,500
New	Advanced Heavy Vehicle Technologies	5,389	7,100	9,100
Old	Implementation and Program Management	7,799	7,400	8,700
New	Implementation and Program Management	7,799	7,400	8,700